

*Hawley's*  
*Condensed Chemical*  
*Dictionary*

**THIRTEENTH EDITION**

*Revised by*  
Richard J. Lewis, Sr.

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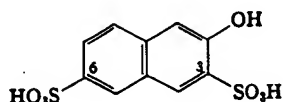
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# R

**R.** (1) Symbol used to represent an organic group in a chemical formula, for example  $\text{CH}_3$ ,  $\text{C}_2\text{H}_5$ ,  $\text{C}_6\text{H}_5$ , etc. (2) A free radical (with superior dot,  $\text{R}^\bullet$ ). (3) The gas constant, equal to  $p_0 v_0 / 273^\circ\text{C}$ . (4) Abbreviation of Rankine temperature scale.

**Ra.** Symbol for radium.

**R-acid.** (2-naphthol-3,6-disulfonic acid;  $\beta$ -naphtholdisulfonic acid).



**Properties:** Deliquescent, colorless needles. Soluble in water, alcohol, and ether.

**Derivation:** Sulfonation of  $\beta$ -naphthol. For details see Schaeffer acid.

**Use:** Azo dye intermediate. The disodium salt is used as a reagent in detection of nitrogen dioxide in the air.

**2R acid.** See RR acid.

**racemate.** (1) The mixture of two optically active components that neutralize the optical effect of each other. (2) Salt of racemic acid.

**racemic substance.** A mixture of dextro- and levorotatory optically active isomers in equal amounts, the resulting mixture having no rotary power. These mixtures are prefixed by  $\pm$  or *dl*-. See *dl*-.

**racemization.** Conversion, by heat or by chemical reaction (e.g., enolization) of an optically active compound into an optically inactive form in which half of the optically active substance becomes its mirror image (enantiomer). This change results in a mixture of equal quantities of dextro- and levorotatory isomers, as a result of which the compound does not rotate plane-polarized light to either right or left since the two opposite rotations cancel each other. This is sometimes referred to as external compensation, as opposed to the internal compensation exhibited by *meso*-compounds.

See *meso*-(1); tartaric acid.

**racephedrine.** (racemic ephedrine; *dl*-ephedrine).  $\text{C}_{10}\text{H}_{15}\text{NO}$ .

**Properties:** Crystals. Mp  $79^\circ\text{C}$ . Soluble in water, alcohol, chloroform, and oils.

**Derivation:** Synthetic.

**Use:** Medicine (also as hydrochloride and sulfate). See ephedrine.

**racking.** Experimental cold-stretching of unvulcanized rubber, whose behavior under stress is unique among natural materials. A thin, narrow strip stretched at, for example, 500–600% at  $0^\circ\text{C}$  will retain that extension indefinitely after release of stress as long as the low temperature persists. In this state it loses its elasticity and has virtually 100% permanent set. It also displays a crystalline X-ray pattern similar to that of a fiber, in contrast to the amorphous structure of the unstretched state. On exposure to room temperature it slowly retracts to its original length; higher temperature increases its rate of recovery. Tests made on racked rubber have shown that crude rubber can be exposed to any degree of low temperature for any length of time without impairment of its properties.

**rad.** That quantity of ionizing radiation that results in the absorption of 100 ergs of energy per gram of irradiated material, regardless of the source of the radiation. The federal radiation safety standard is 0.5 rem per person per year for nonoccupational exposure, and even this is considered too high by some authorities. Occupational exposure is set at 5 rem per year. See rem.

**radiation.** Energy in the form of electromagnetic waves (also called radiant energy, or light). It is emitted from matter in the form of photons (quanta), each with an associated electromagnetic wave having frequency ( $\nu$ ) and wavelength ( $\lambda$ ). The various forms of radiant energy are characterized by their wavelength, and together they compose the electromagnetic spectrum, the components of which are as follows: (1) cosmic rays (highest energy, shortest wavelength), (2)  $\gamma$ -rays from radioactive disintegration of atomic nuclei, (3) X-rays, (4) UV rays, (5) visible light rays, (6) infrared, (7) microwave, and (8) radio (Hertzian) and electric rays. All these are identical in every way except wavelength, those having the shortest wavelength being the most penetrating. They are not electrically charged and have no mass, their velocity of propagation is the same, all display the properties characteristic of light and have a dual nature (wave-like and corpuscular). In a looser sense the term *radiation* also includes energy emitted in the form of particles that possess mass and may or may not be electrically charged, (i.e.,  $\alpha$  [positive] and  $\beta$  [negative]) and also neutrons. Beams of such particles may be considered as "rays." The charged